



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/774,781	01/30/2001	Naoya Hasegawa	9281-3917	2588

7590 10/26/2004

Brinks Hofer Gilson & Lione  
P.O. Box 10395  
Chicago, IL 60610

EXAMINER

LETSCHER, GEORGE J

ART UNIT

PAPER NUMBER

2653

DATE MAILED: 10/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

BS

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/774,781	HASEGAWA ET AL.
Examiner	Art Unit	
George J. Letscher	2653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1)  Responsive to communication(s) filed on 28 June 2004.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

- 4)  Claim(s) 1-34 is/are pending in the application.  
4a) Of the above claim(s) 7-14, 16 and 27-34 is/are withdrawn from consideration.  
5)  Claim(s) \_\_\_\_\_ is/are allowed.  
6)  Claim(s) 1-6, 15 and 17-26 is/are rejected.  
7)  Claim(s) \_\_\_\_\_ is/are objected to.  
8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on 30 January 2001 is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/30/01, 4/9/01, 9/7/04

4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.

5)  Notice of Informal Patent Application (PTO-152)  
6)  Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-26, in the reply filed on 2/20/04 is acknowledged.
  
2. Claims 7-14 and 16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species. Claim 1 is a generic claim. Any withdrawn claims dependent upon claim 1 will be rejoined upon allowance of claim 1. Election was cited with traverse in the reply filed on 6/28/04; however, Applicant did not provide a traversal with said statement. Therefore, the election has been effectively made without traverse and has been considered as such by the Examiner. Additionally, it is noted that Applicant elected claims 1-7, 15 and 17-26; however, claim 7 is part of the species including the mirror reflective layer that is not part of the elected species. This claim has been withdrawn with claims 8-14 and 16 as indicated above.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5, 15 and 17-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Hasegawa et al (JP 2000-031562).

The aforementioned claims recite the following features, *inter alia*, disclosed in Hasegawa et al: a spin-valve thin-film magnetic element comprising a substrate (not shown), an antiferromagnetic layer (4), a pinned magnetic layer (3) in contact with the antiferromagnetic layer, the magnetization vector of the pinned magnetic layer being pinned by an exchange coupling magnetic field between the antiferromagnetic layer and the pinned magnetic layer, a nonmagnetic conductive layer (2) in contact with the pinned magnetic layer; a free magnetic layer (1) in contact with the nonmagnetic conductive layer; an exchange bias layer (upper element 4) for magnetizing the free magnetic layer so that the magnetization vector of the free magnetic layer is substantially orthogonal to the magnetization vector of the pinned magnetic layer, a pair of electrode layers (8) for supplying a sensing current to the pinned magnetic layer, the nonmagnetic conductive layer, and the free magnetic layer; and a mean-free-path-extending layer (upper element 2) provided between the free magnetic layer and the exchange bias layer for controlling the magnitude of an exchange coupling magnetic field between the free magnetic layer and the exchange bias layer and for extending the mean free path of conduction electrons. The mean-free-path-extending layer (upper 2) includes a back layer

comprising a nonmagnetic conductive material (Cu). The back layer has a thickness in the range of 5 to 30 angstroms. The back Layer comprises at least one element selected from the group consisting of Au, Ag, and Cu; see Figure 3 of Hasegawa et al. The antiferromagnetic layer, the pinned magnetic layer, the nonmagnetic conductive layer, the free magnetic layer, and the exchange bias layer are deposited in that order on the substrate. The electrodes are on each planar side of the magnetic sensor layers and the antiferromagnetic layer as well as the exchange bias layer are MnPt. The antiferromagnetic material comprises an alloy represented by the following formula:  $XmMn-m$  wherein X is at least one element selected from the group consisting of Pt, Pd, Ir, Rh, Ru, and Os, and the subscript m is in the range of 48 atomic percent to 60 atomic percent and for claims 23-26, an alloy represented by the following formula:  $PtqMn100-q-jLj$  wherein L is at least one element selected from the group consisting of Au, Ag, Cr, Ni, Ne, Ar, Xe, and Kr, and the subscripts q and j are in the ranges of 48 atomic percent  $\leq q + j \leq$  60 atomic % and 0.2 atomic %  $\leq j \leq$  10 atomic %; see paragraphs 0028-0033 & 0073 of Hasegawa et al.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al in view of Gurney et al (US 5,422,571).

The description Hasegawa et al of is in paragraph 5, supra. Additionally, Hasegawa et al disclose the back layer being Cu.

Regarding claim 6, Hasegawa et al do not teach the Cu back layer having a thickness in the range of 15-25 Angstroms.

Gurney et al disclose a magnetic spin valve sensor having a non-magnetic back layer which has a thickness in the range of 15-25 Angstroms (4-60 Angstroms; see claim 9 of Gurney et al).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the spin valve magnetic element

having a Cu back layer as taught in Hasegawa et al with the back layer having a thickness of 15-25 Angstroms as shown in Gurney et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to have provided the spin valve magnetic element having a Cu back layer as taught in Hasegawa et al with the back layer having a thickness of 15-25 Angstroms as shown in Gurney et al since it provided an increased change in conductance over any ferromagnetic free materials without a back layer; see column 6, lines 50-54 of Gurney et al.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Letscher whose telephone number is (703) 305-7912.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4750.

George Letscher  
October 19, 2004



**George Letscher**  
**Primary Examiner**  
**AU 2653**